

**A STUDY IN LEVEL OF
MITIGATION STRATEGIES FOR EMISSIONS OF
GREENHOUSE GASES**

**By
CHAN KEN MING**

**Thesis submitted in partial fulfillment of the
requirements for the degree of Bachelor of Chemical
Engineering**

April 2006

ABSTRACT

In this project, a control model has been developed to estimate the CO₂ emissions from 1998 to 2012 according to the Kyoto Protocol. The Kyoto Protocol called for each developed (Annex I) country to reduce annual emissions in the period 2008-2012 to about 5% below what they had been in 1990. The countries of study were Australia, New Zealand, United Kingdom, United States of America, Germany and Malaysia. A PID controller has been added in the development of the model. The PID controller shows how decision makings are done in these countries. A country may make decisions based on the past experiences (feedback), current trend and future considerations (feedforward). K_d represents decision makings based on past experiences; K_i indicates decision makings are considering future scenario and factors and finally, K_p represents decision makings based on current scenario. As indicated from the result obtained Australia, New Zealand, United States of America, and Malaysia are not on track to meet the requirement by the Protocol. Meanwhile, Germany and United Kingdom are going to meet the requirement because their policy efforts and special circumstances like restructuring of East Germany after reunifications and the liberalization of the energy markets in the UK. The Protocol only contains commitments through 2012, thus implying the urgent need for new negotiations on a Post-2012 phase.

KEYWORDS: Kyoto Protocol, CO₂ emissions, fuel consumption, decision makings, mitigation strategies, emission factor.